

CLAIMS

1. An organic polymer light-emitting element material having a gold complex structure as a part of the side chain or crosslinking group.

2. The organic polymer light-emitting element material as claimed in claim 1, wherein the molecular weight of the organic polymer is from 1,000 to 1,000,000.

3. The organic polymer light-emitting element material as claimed in claim 1 or 2, which is obtained by polymerizing a composition containing a polymerizable gold complex where at least one ligand has a polymerizable functional group as the substituent.

4. The organic polymer light-emitting element material as claimed in claim 1, wherein the gold complex structure has an organic phosphine compound as at least one ligand.

5. The organic polymer light-emitting element material as claimed in claim 3, wherein at least one ligand of the polymerizable gold complex is an organic phosphine compound.

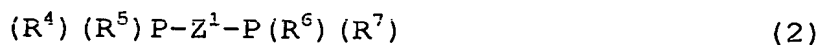
6. The organic polymer light-emitting element material as claimed in claim 5, wherein at least one organic phosphine compound as the ligand has a polymerizable functional group as the substituent.

7. The organic polymer light-emitting element material as claimed in any one of claims 4 to 6, wherein the organic phosphine compound is represented by formula (1):



wherein R^1 to R^3 each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an alkoxy group having 1 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent or an aryloxy group having 6 to 15 carbon atoms which may have a substituent.

8. The organic polymer light-emitting element material as claimed in any one of claims 4 to 6, wherein the organic phosphine compound is represented by formula (2):



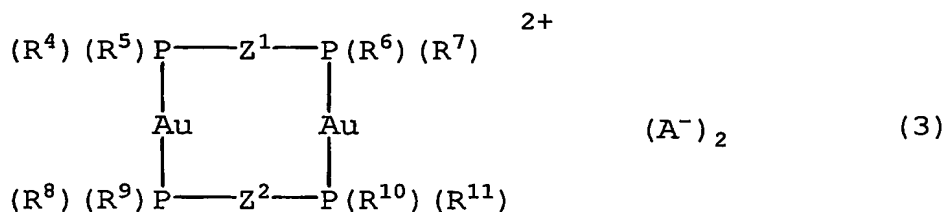
wherein R^4 to R^7 each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an alkoxy group having 1 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent or an aryloxy group having 6 to 15 carbon atoms which may have a substituent, and

Z^1 represents an organic group which crosslinks two phosphorus atoms, such as alkylene group having 1 to 20

carbon atoms which may have a substituent, alkylene group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, or arylene group having 6 to 20 carbon atoms which may have a substituent.

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9. The organic polymer light-emitting element material as claimed in any one of claims 3 to 6, wherein the polymerizable gold complex has a structure represented by formula (3):



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wherein R^4 to R^7 and Z^1 have the same meanings as in claim 8, R^8 to R^{11} each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an alkoxy group having 1 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent or an aryloxy group having 6 to 15 carbon atoms which may have a substituent,

Z^2 represents an organic group which crosslinks two phosphorus atoms, such as alkylene group having 1 to 20 carbon atoms which may have a substituent, alkylene group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, or arylene group having 6 to

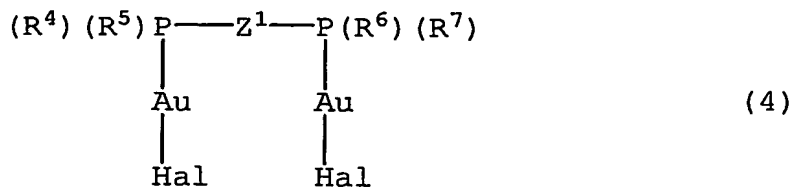
20 carbon atoms which may have a substituent, and

A⁻ represents a monovalent anion,

provided that at least one of R⁴ to R¹¹, Z¹ and Z² has a polymerizable functional group.

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10. The organic polymer light-emitting element material as claimed in any one of claims 3 to 6, wherein the polymerizable gold complex has a structure represented by formula (4):

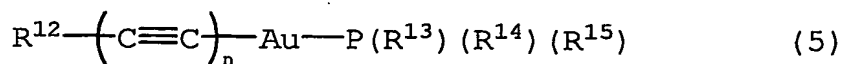


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wherein R⁴ to R⁷ and Z¹ have the same meanings as in 8, and Hal represents a halogen atom, provided that at least one of R⁴ to R⁷ and Z¹ has a polymerizable functional group.

15 11. The organic polymer light-emitting element material as claimed in any one of claims 1 to 4, wherein the gold complex structure has at least one alkynyl ligand.

20 12. The organic polymer light-emitting element material as claimed in any one of claims 3 to 6, wherein the polymerizable gold complex has a structure represented by formula (5):



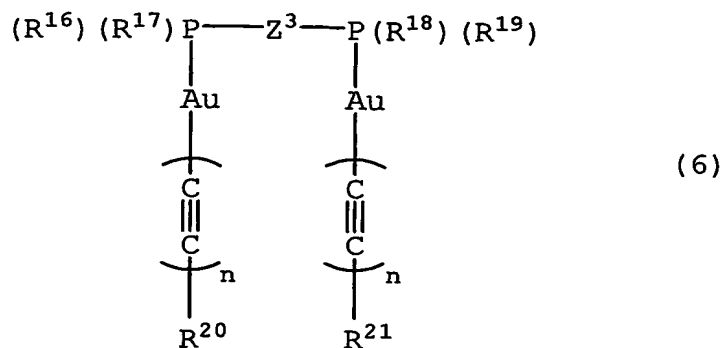
25 wherein R¹² represents a hydrogen atom, a cyano group, a silyl group having 3 to 20 carbon atoms, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an

alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent, an acyl group having 1 to 15 carbon atoms, a carboxyl group, or an alkoxy carbonyl group having 2 to 15 carbon atoms,

R^{13} to R^{15} each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an alkoxy group having 1 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent or an aryloxy group having 6 to 15 carbon atoms which may have a substituent, and

n represents an integer of 1 to 5, provided that at least one of R^{12} to R^{15} has a polymerizable functional group.

13. The organic polymer light-emitting element material as claimed in any one of claims 3 to 6, wherein the polymerizable gold complex has a structure represented by formula (6):



wherein R^{16} to R^{19} each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an alkoxy group having 1 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent or an aryloxy group having 6 to 15 carbon atoms which may have a substituent,

R^{20} to R^{21} each independently represents a hydrogen atom, a cyano group, a silyl group having 3 to 20 carbon atoms, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent, an acyl group having 1 to 15 carbon atoms, a carboxyl group, or an alkoxy carbonyl group having 2 to 15 carbon atoms, R^{20} and R^{21} may be linked with each other via a crosslinking group,

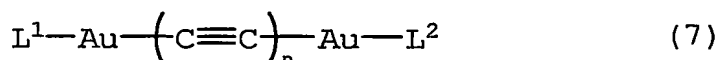
Z^3 represents an organic group which crosslinks two phosphorus atoms, such as alkylene group having 1 to 20 carbon atoms which may have a substituent, alkylene group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, or arylene group having 6 to 20 carbon atoms which may have a substituent, and

n represents an integer of 1 to 5,

provided that at least one of R^{16} to R^{21} and Z^3 has a polymerizable functional group.

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14. The organic polymer light-emitting element material as claimed in any one of claims 3, 5 and 6, wherein the polymerizable gold complex has a structure represented by formula (7):



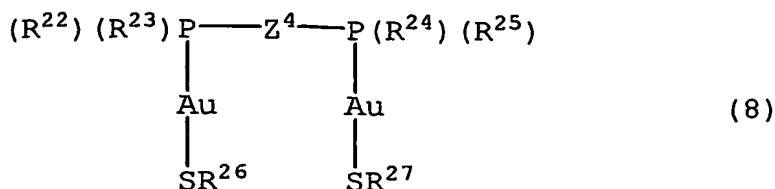
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wherein L^1 and L^2 each represents a monodentate or bidentate ligand, at least one of L^1 and L^2 is the organic phosphine compound described in claim 7 or 8, and n represents an integer of 1 to 5.

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15. The organic polymer light-emitting element material as claimed in any one of claims 3 to 6, wherein the polymerizable gold complex has at least one thiolato ligand.

25 16. The organic polymer light-emitting element material as claimed in any one of claims 3 to 6, wherein the polymerizable gold complex has a structure represented by formula (8):



wherein R^{22} to R^{25} each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an alkoxy group having 1 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, a heteroaryl group having 3 to 15 carbon atoms which may have a substituent or an aryloxy group having 6 to 15 carbon atoms which may have a substituent,

R^{26} and R^{27} each independently represents a hydrogen atom, an alkyl group having 1 to 15 carbon atoms which may have a substituent, an alkyl group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, an alkenyl group having 2 to 15 carbon atoms which may have a substituent, an aryl group having 6 to 15 carbon atoms which may have a substituent, or a heteroaryl group having 3 to 15 carbon atoms which may have a substituent, and R^{26} and R^{27} may be linked with each other via a crosslinking group,

Z^4 represents an organic group which crosslinks two phosphorus atoms, such as alkylene group having 1 to 20 carbon atoms which may have a substituent, alkylene group having 3 to 15 carbon atoms which has a cyclic structure and which may have a substituent, or arylene group having 6 to 20 carbon atoms which may have a substituent,

provided that at least one of R^{22} to R^{27} and Z^4 has a polymerizable functional group.

17. The organic polymer light-emitting element material as
5 claimed in any one of claims 3 to 6, wherein the polymerizable functional group has radical polymerizability.

18. The organic polymer light-emitting element material as
10 claimed in any one of claims 3 to 6, wherein the polymerizable functional group is an organic group having a carbon-carbon double bond.

19. An organic polymer light-emitting element comprising a
15 pair of electrodes having interposed therebetween at least one layer comprising the organic polymer light-emitting element material described in any one of claims 1 to 18.

20. An organic polymer light-emitting element comprising a
20 pair of electrodes having interposed therebetween at least one layer each comprising one or more organic polymer light-emitting element material described in any one of claims 1 to 18.